

## CHAPTER 2

# Water as an Object of Anthropological Inquiry

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### Abstract

Five themes are central within the anthropological literature on water. The first is the elemental nature of water: It combines material and symbolic properties in highly specific ways. The second is valuation: Water is a resource that has value for human well-being and productive activity, and hence is part of economic systems; it is also a right that has meaning from our place in a natural and cultural world, and hence is part of political systems. The third is distribution: This valued resource and deeply felt right is shared—often unequally—among members of societies and among the world’s inhabitants. The fourth is governance, since organizations and rules structure the control, management and distribution of water. The fifth is politics, understood as the conflicts to control water in civil society and the public sphere.

As an object of anthropological inquiry, water is both timely and timeless. It is timely because it corresponds so well to the combinations of disparate elements that make up the contemporary vision of engaged, innovative academic research. Water is at once a topic of profound scholarly significance and the object of widespread public concern, and its analysis requires many forms of collaboration, across nations, across disciplines, across the divide that lies between academic and applied research, and across the gap that often separates social scientists and the people with whom they conduct their

research. Indeed, the study of water integrates expert and lay knowledge, as much contemporary research does; it connects abstract notions and concrete experiences, and it examines the place of water in human life both through numerical measures of need such as the Water Poverty Index or the Falkenmark Water Stress Indicator, and through more concrete and vivid images, ones that virtually every anthropologist has seen, of herders desperate for pasture for their flocks, of women who every day carry jerrycans of water for kilometres, of children who cross open sewers on narrow planks to reach their homes.

And yet water is timeless as well. People are fascinated by the ordinary sounds that water makes: sounds produced by waves that lap, or crash, on a beach, or by a stream that rushes over rocks, or by rain that falls on leaves in a forest, or by drops that fall from the ceiling of a cave to a pool on its floor. These sounds evoke associations are at once familiar and fresh, showing attributes of water that people know instantly, without needing to think about it: the ability of water to surge as waves, with endless energy, on a beach; to flow steadily in a stream; to fall as rain in a forest; to drip slowly in a deep cavern. We recognize water instantly, we have all known it since our infancy, and yet it can hold our attention as if it were new to us each time. Water is widely spread in many places, and a fundamental component of each of those places. We can be struck equally by the immense diversity of forms which it can assume and by the underlying qualities present in all these forms. One way of describing the unity behind these characteristics is to call water “elemental.” It is this elementality that gives water its timeless quality.

The term “elemental” seems a productive one in the context of an overview such as this one. It evokes the early roots of European philosophy and science in the ancient Greeks, and, more specifically, the four elements that Aristotle discussed in many sections of his *Physics*. As is well known, he listed four elements, earth, air, water, and fire; he also spoke of a fifth element, ether, found only in the heavenly realm far from our world.

There are many interpretations that one can give to Aristotle’s *Physics*, a work that drew on many sources and that represented an effort to bring disparate ideas into a coherent whole. A simple, naïve

reading would see in the four elements a primitive, preliminary version of a scientific truth that was established later; this reading would claim that talking of earth, water and air was a crude foreshadowing of the principle that matter can exist in three states, as a solid, a liquid, or a gas (fire might be equated with energy, or plasma, or a kind of unstable gas). A more complex view would be to delve into Aristotle's opposed pairs of heat and cold, dryness and wetness, and to explore the logic behind his belief that is primarily cold and secondarily wet, is primarily dry and secondarily cold, and so forth. Some anthropologists and historians have examined the associations between these qualities as expressed in the natural world and in the human body.

One can also read *Physics* closely, seeing it as a reflection on the world which, despite its philosophical goals, is almost poetic in nature. It is interesting to consider the concrete examples upon which Aristotle focuses: the rain that spoils wheat left on a threshing-floor, the stone worn away by dripping water, the vessel that fills with air as the water which it contained is poured out, and to ponder his reasons for selecting these from so many alternative objects and processes that he could have described. These examples serve to elaborate his points about the underlying attributes of matter, volume, motion, and causation, but they also seem to have had an additional fascination for him. Perhaps it was the protean nature of water that stimulated his curiosity and caused his attention to linger more on this element than on the others. He was familiar to metamorphosis in the world of living creatures and in the world of myth, but water, alone among the elements, has the capacity to change its nature, by freezing and melting, by evaporating, boiling, and condensing.

To move towards the theme of waterworlds of this volume, and to suggest some specifically anthropological insights into water as an object of inquiry, it is a useful exercise to consider the worlds that could be associated with Aristotle's other elements. Our planet's atmosphere is much on our minds these days, so one could easily speak of airworlds. The main story would be one of pollution and scale, starting with the concerns about urban air pollution in the 1960s and 1970s, and continuing with the worries about acid rain, often a transboundary problem, in the 1970s and 1980s. At that time,

the genuinely global scale of atmospheric concerns developed, first with the attention to the ozone hole and then with the growing awareness of climate change, a topic of great significance within academic, policy and popular circles. Despite the overall importance of climate change, despite its links to the water issues that we face, and despite its suggestion of the need for a reshaping of environmental thought (McKibben 1989), one would not speak of airworlds: instead, there is a different vocabulary, one of impacts, of mitigation and adaptation.

Earthworlds might be a possibility, since soil bears such symbolic weight. It is the source of the food that sustains us, and it embodies the nations of which we are citizens. At its most evocative, we can think of the exiles who travel with a small vessel bearing a sample of the homeland's earth, and who kneel to kiss the soil on returning. And people have often been struck by the capacity of the earth to preserve objects buried in it. This capacity resonated particularly in the Romantic Era, when scientists and amateurs were struck with an excavation craze. They sought to impose some order on the objects that were accumulating in storerooms of museums and in the attics of private collectors, and proposed grouping and displaying them by three eras, the Stone Age, the Bronze Age, and the Iron Age, categories that were of interest in Denmark, throughout Europe and Asia, and of significance in Africa and the Americas as well. Students of earthworlds might look to the symbolic meanings and cultural framings of soil that influence agricultural policy, or study the efforts of city-dwellers to keep gardens, and to return to the soil each summer on vacation. They could consider the way that soil—as a source of dirtiness and pollution, but also as the basis of agriculture and human life—is linked to the human body and to distinctions among different categories of humans (Orlove 1998). But these earthworlds would not be as broad as the waterworlds.

Though the cultural history of fire is an enormously rich subject (Pyne 1992), fireworlds might be the most difficult to imagine, perhaps because fire itself is figured as changing and unstable. Perhaps one could look to the recent reshaping of forest management. There has been a striking shift from the fire suppression practices that were once dominant to an interest in controlled and selective burning,

often associated with indigenous groups—in Australia and California, among other places—who had an intimate, comfortable relation with fire. Or one could turn to the deep cultural meanings of fire, the ones that Claude Lévi-Strauss explored in many settings in his *The Raw and the Cooked*. The current attention to energy sources leads to heat and, in a certain way, to fire as well. But these topics do not link with each other as the different aspects of water do.

It is water, more than these other elements, that forms worlds. In contrast with these others, water has retained its elementality from Aristotle's times to ours. We now know that fire is a rapid and complex chemical process, or rather a set of such processes. Earth, in the sense of soil, is a kind of ecosystem, composed not only of physical particles of different size, clay and silt and sand, but of organic matter and many microscopic organisms. It seems like a substance peculiar to our world; though some planetary scientists talk of Martian soil and even lunar soil, the phrase has an odd ring. Air is a mixture of different molecules, mostly nitrogen and oxygen, which bears small particles as well, a unique mixture whose composition has varied throughout our planet's long history, more than four billion years long. If soil is specific to our world, very different from the dust and sand that might cover other planets, air has many analogues, in the atmospheres of other planets and satellites. But water, in its purest form at least, is a molecule,  $H_2O$ , far less removed from an element in our contemporary understanding than the other three in Aristotle's scheme. We continue to note many specific properties of water—the temperatures at which it freezes and boils, its almost complete incompressibility, its ability to dissolve many compounds. We explain these properties through contemporary scientific models, often drawing on the particular arrangement of electrons in hydrogen and oxygen atoms, though many aspects of water continue to elude physicists and chemists. Moreover, water is precisely the same molecule wherever it is found in the universe, identical to the substance on our earth. The first confirmed discovery of water on a planet outside our solar system was of sufficient import to gain the paper (Tinetti et al. 2007) that reported it the coveted lead position in an issue of the journal *Nature*. The paper's thirteen co-authors, writing in 2007, demonstrated the existence of water in the atmos-

phere of a planet named HD 189733b, of the class of planets called “hot Jupiters”. It lies about 63 light-years from our solar system, in the constellation Vulpecula. Much larger and hotter than our earth, it cannot support life, and yet the presence of water on it raises hope that water will someday be found on another, more hospitable world.

#### Four additional themes in waterworlds:

##### Value, equity, governance, and politics

Having considered other elements and other planets, we may now return to waterworlds. What insights about water can be stimulated by anthropological concepts and methods? What import do these insights have for academic research and for public debates? We would like to offer a provisional list of four specific key areas of anthropological contributions. These areas are the matters of value, equity, governance, and politics, terms that are of importance to anthropology and to other social science disciplines as well.

##### *Value: natural resources and human rights*

How do “nature” (or “environment”) and “culture” (or “society”) intersect in waterworlds? One way to answer that question is to say that water is on the one hand a resource that has value for human well-being and productive activity, and hence is part of economic systems, and on the other hand a right that has meaning from its connections to our place as conscious social beings who live in a natural and cultural world, and hence is part of political systems. Anthropologists are particularly well suited to consider the ways that water, a substance with specific properties, is understood and used differently in a variety of social settings (Bachelard 1942; Hamlin 2000). With the possible exception of air, water is the most immediate need and a right, especially since the human body has a maximum capacity for water as well as a minimum required for survival. Water is also essential for bathing, important to human health and, in most but not all cultures, experienced as a bodily need as well; water for domestic animals and irrigation is often crucial to assure

subsistence needs. Moreover, water is deeply linked to pleasure, as cultural histories of the seashore have demonstrated. This close association with the human body and with life brings to water a depth of symbolic importance that even exceeds its connection to survival. In Levi-Strauss' term, it is "good to think" (Renne 1991; Shapiro 1995); a particularly rich example can be found in the votive ships, with their multiple meanings, located in churches throughout Denmark. And water can be also termed "good to experience" (Anderson & Tabb 2002). A recent anthropological study (Wilk 2006) traces historical shifts in meanings of "potable" water in several countries. And yet, much as water moves from a biological necessity to a cultural substance, it also moves to an economic resource. It enables craft production, commerce and industry; in the form of fountains and baths, it is an amenity or even a luxury. It is worth remembering that waterworlds are threatened not only from climate change but also from increased consumption: one need only think of golf courses in Arizona, Andalucía and Abu Dhabi, all regions in which water tables are dropping and in which poor people have inadequate access to water. Moreover, water can be a resource with negative value as well as positive value. Water can be destructive, whether in the form of floods which ruin houses and farmland, damp which creates rot, or strong waves which erode coastlines. These multiple connections to water can mark the boundaries of groups and communities, defined by shared involvement with water. Hugh Raffles (2002) offers a particularly rich ethnography of the way a major waterway has changed over time and has also been imagined as a political fraught space. A counterexample is Timothy Mitchell's widely-read book (2002) on colonialism, modernity and power in Egypt; despite its attention to forms of control of persons, property and knowledge, this book pays scant attention to the Nile and to the role of water management and regulation in the shifts in political order.

*Equity: access and distribution*

How is this valued resource and deeply felt right to be shared among the members of a society or the inhabitants of the world? This matter

is ineluctably tied to two other linked questions: of justice, on the one hand, and of political economy, on the other. A particularly crucial issue is the equity of access to safe drinking water for people of all classes, ethnic and racial groups, of all ages, and of both genders. Sustainability of water use may not be feasible any longer in some especially pressed countries unless demand is cut back and available supplies better managed through conservation. Political scientists have studied the complex factors and strategic interests that shape water distribution within and between nations, as well as the consequences of treating water as a commodity and allowing the market to allocate it in the name of efficiency (Whiteley, Ingram, and Perry 2008). Peters (1994) offers a telling account of the factors that have led to a grossly unequal distribution of water in colonial and post-colonial Botswana.

*Governance: organization and rules*

How far do institutional economics and economic sociology lead us in understanding the organizations that manage and distribute water? These organizational questions interact with the distributional questions. The physical properties of water—its capacity to flow, its tendency to be absorbed by soil and to evaporate into the air, its incompressibility—strongly constrain the systems for its distribution. The uneven distribution of water in the world promotes the development of large-scale water distribution systems. Considerable investments of capital and labour must be made to build and maintain water facilities. Indeed, recent discussions of common property resources draw heavily from examples of irrigation works, which have been both a locus of efficient and just participatory governance (Ostrom 1990) and of state parasitism (Wittfogel 1957). This study of water organization is a particularly promising site for the integration of economic, sociological and anthropological perspectives on water, as Geertz (1972) noted in his contrast of irrigation in Indonesia and Morocco, and as Mosse (1997) described in his account of the patterning of irrigation institutions in semi-arid zones in India. These questions of governance can be of particular importance at times of crisis and scarcity, and the question of resilience of



water supply may be as much as question of governance as it is of the physical availability of water.

*Politics: discourse and conflict*

How do the three previous questions lead us to understand the struggles to control water in civil society and the public sphere? As Ernst shows in his study of political conflicts over regulation of Chesapeake Bay (2003), three categories or concepts seem to dominate the analytical talk about water sustainability: conservation, justice, and governance; these three categories correspond roughly to our first three. The term “governance” is a useful one, but its association with the notion of “management” may presume the agreement of all parties on the goals that they share and on the values that they place on water: the debates and conflicts over these goals and values lead us to the sphere of politics. With its propensity to flow, and with its ready partibility, water is almost without exception shared among people and among localities, and is therefore linked to collectivities. The organizations, mentioned above, that manage water operate within a broader political and regulatory context. These public contexts draw on a variety of forms of discourse, including property law and human rights. As Guillet (2003) indicates, water law is often a crucial site of contestation between earlier regional customary law and nationalist reform. The political contestations over the construction of dams and distribution of water show these interacting forces with particular clarity, since they lead water to shift between different individuals and groups (McCully 2001; McCormick 2007). In a discussion of dam-building in colonial and neo-colonial Rhodesia and post-colonial Zimbabwe, Hughes (2006) shows that the striking visual transformation of the landscape by water projects can become a subject of contestation as important as the actual distribution of water for drinking and agriculture. Many anthropologists look to see how different groups insert themselves in the larger debates over water sustainability. This question leads to an examination of the strategies of discourse of water sustainability, and to a comparison between the framings that consider practical challenges with solutions and the framings that address broader

relations among state, society and environment. Researchers can consider the representations of water mobilized by institutions (for example, NGOs or the state) in public media like newspapers and television or in commemorations like a water awareness day; Beamish (2000) traces the evolution of such images in a question of water pollution. More broadly, research can consider the debates that circle over large-scale water projects. The power of such representations can lead to massive mobilizations, whether in Bolivia, where municipalities privatized water supplies (McNeish 2006), or in Peru, where mines altered traditional systems for irrigation and potable water in rural areas (Li 2009).

Taken as a whole, these four themes (value, equity, governance and politics) show contributions of anthropology to the examination of the collective, visible and debatable dimensions of water, in sum, its public life. Though water is often consumed in private settings, and though many of the experiences of water are private, water passes through public institutions to reach its consumers. Even the residents on an isolated farm who draw water from a well form part of watersheds, of systems of water (and groundwater) management, of discourses of water quantity and quality. More than other topics, anthropology can allow researchers to integrate themes that range from value and symbolism, to identities and entitlements, to systems of distribution and governance, to conflicts and disputes, contributing in this fashion both to academic research and to pressing human concerns.

### Three components of waterworlds:

#### Watersheds, waterscapes, and water regimes

Having touched briefly on these attributes of water, and knowing that they will be considered in greater depth and detail in the other chapters in this volume, we may now turn more generally to waterworlds. The four attributes of water that we have mentioned have been incorporated by many anthropologists into the study of waterworlds; these four elements are perhaps conceptual equivalents of the different-coloured blocks in a Lego set, which can be assembled into a variety of constructions. In recent years, anthropologists have

concentrated on three particularly important kinds of constructions, constructions that offer models of different components of waterworlds. These three components of waterworlds are watersheds, waterscapes, and water regimes.

The term watershed is probably the most familiar of the three. From the early nineteenth century, the term was used to refer to boundaries between drainages and to the high country that separated drainages; by the mid-nineteenth century, it was also used to refer to the slopes down which streams and rivers flowed. In 1877 the British biologist Thomas Huxley proposed, "to avoid all ambiguity it is perhaps best to set aside the original meaning of 'watershed', and employ the term to denote the slope along which the water flows, while the expression 'water-parting' is employed for the summit of this slope." (Huxley 1877:18) Huxley was also known for the strong support that he gave to Charles Darwin, for his famous grandsons (the novelist Aldous Huxley, the first director of UNESCO Julian Huxley and the Nobel-prize winning biologist Andrew Huxley), and for another lexical innovation: he was the person who coined the term "agnostic," a few years before he clarified the meanings of "watershed."

The term watershed and its synonym water catchment are widely used in scientific and policy contexts. The notion is a simple and powerful one: because water flows downhill, each spot in the world can be assigned to a specific topographical basin. The water in each connected basin forms a watershed, and each watershed can be managed and governed as a unit. The boundaries of a watershed define a set of participants in this management. The term serves to bring together natural scientists, government officials, members of local organizations and ordinary citizens. In the last few decades, many watershed councils have formed; these are generally non-profit participatory organizations that seek environmental quality and sustainable development. In addition to such councils, other groups seek participatory processes to promote more effective, equitable, and sustainable water management; the semi-arid region of north-eastern Brazil contains a number of examples (Lemos & Farios de Oliveira 2004, 2005). The popular notion of Integrated Water Resource Management rests on watersheds as units of management. At a much lar-

ger scale, there are many watersheds, such as those of the Rhine (Cioc 2002), that extend across national boundaries and that are managed as units by organizations whose members are nations.

Though we recognize that these watershed councils and other groups have done much good work, and seem generally in agreement with the authors in this volume, we would like to include a few words of caution about the term. As anthropologists, we think that the conceptual boundaries that humans use reflect cultural systems as well as the natural world, so it gives us pause to hear that an administrative unit has a material existence prior to human thought. It is widely recognized that other environmental and ecological categories, such as “forest” and “wetland,” include both natural and social elements, since their characteristics and boundaries are complex. One can grasp that such categories are socially constructed, while also understanding that such construction is at times more constrained, at other times less constrained, by nature. Watersheds may be simpler, more straightforward units than forests and wetlands, but they are not entirely and unproblematically present in nature, as Strang shows in her account (2004) of the River Stour in England. Firstly, watersheds vary enormously in scale, so that a single watershed may both contain smaller sub-watersheds, and form part of a larger watershed, so the selection of a particular scale is at least in part a social choice. Secondly, water moves in many ways. Groundwater is a crucial resource in many regions, including several settings in Africa and the Middle East that are discussed in this volume; the boundaries of groundwater basins do not always correspond to watersheds, so that residents of a given watershed may dig wells that directly affect the residents of another watershed. Deforestation in one watershed may reduce the amount of water vapour that is carried to another watershed downwind of it, creating water scarcity in this second watershed. And the long human history of digging canals, levelling hills, and constructing dikes has also led water to move from one watershed to another. In this way, watersheds are not always the well-bounded management units that they can be imagined to be. And, finally, the notion of watershed tends to go hand-in-hand with the notion of stakeholder. The participatory democratic practices of watershed councils and other groups rest on

this notion. They usually understand stakeholders as the residents, property-holders and public bodies within the boundaries of the watershed and presume that these stakeholders seek to assure sustainable water use because of their commitments to the watershed. Though these concerns are generally positive ones, it is worth keeping in mind that they represent certain exclusionary practices as well: individuals may well care deeply about areas far from the ones in which they live. (Stated most forcefully, the idea of stakeholder can be linked to the archaic and widely rejected principle of allowing only property-owners to vote [Holston 2008].) And even among the stakeholders who gain seats at the discussion table, some are more powerful than others. Phrased more simply, a focus on watersheds can rest on a naïve and simplistic view of ecological citizenship, even though this focus is often progressive in practice.

The second term, “waterscape,” has been used since the mid-nineteenth century, by analogy with the word “landscape,” to describe works of art that depict scenery that includes bodies of water; in recent years, natural scientists have spoken of “waterscape ecology” as an aquatic specialization within “landscape ecology,” the field that studies the interactions of contiguous ecosystems. This term gained attention after its appearance in an influential 1999 article by the geographer Erik Swyngedouw, in which he considers Spain in the period 1890-1930. He draws on political economy approaches within geography in order to examine the production of places, more specifically waterscapes. He emphasizes the ideological dimensions of place in his account of the construction of dams and canals, and of the creation of new administrative units based on watersheds. Other works examine the visual, experiential and cultural aspects of waterscapes more extensively; the historian David Blackbourn’s 2006 account of the reshaping of rivers, marshes, lakes and coasts in nineteenth and twentieth century Germany is a good example. These and other works show that water is not merely an economically valuable resource that flows through spaces, but also a culturally and experientially meaningful substance that is present in places. Though humans are never fully aquatic, they are often, perhaps always, hydrophilic, and the human sense of place often engages with water as well as with land. A number of examples can be

found in the anthropological literature; of particular importance are the accounts of irrigated rice landscapes in East Asia and Southeast Asia by Harold Conklin (1980), Francesca Bray (1986), Steve Lansing (1991), and others. Other chapters in this volume address waterscapes, including South Indian coastal fishing villages, Icelandic bogs, Siberian rivers, and Saharan oases and wells.

The third term, “water regime,” had a specific meaning within the field of hydrology, as the pattern of water flow in a freshwater ecosystem, but it is increasingly used in political science and other fields. It borrows the term “regime” from the field of international relations, where regimes are defined as “sets of implicit or explicit principles, norms, rules, and decision-making procedures around which actors’ expectations converge in a given area” (Krasner 1983:2). The term has been useful in this field, because it helped explain how nations often cooperate. Similarly, it can be used to examine cooperation and coordination among water-users, who, like nations, might seem to be autonomous and to have conflicting interests. Reflecting its origins, the notion of water regime has been applied to international relations; for example, the political scientist Stefan Lindemann recently (2008) traced the multiple factors that have led to successful management of water quality in the Rhine and Elbe watersheds. But the term can also apply to specific national systems for regulating and managing water; Buller (1996) contrasts the French and British rules and institutions in the period of increasing integration into European frameworks. Galaz (2004) contrasts the water regimes in periods of public and corporate provision of water in Chile. He offers useful insights into the ways that the more recent water regime, consistent with other politics of privatization and market regulation of resources, weakens the rights of several groups of water users and reduces their ability to voice their concerns. Though Galaz’ commitment to game theory is quite different from the major approaches in this volume, his use of the notion of water regime is a productive one that could well be applied to other social movements associated with privation of water. One could study water regimes at other scales; the anthropological research on water regimes in East and Southeast Asia is particularly rich, showing the interactions of local, regional and state institutions. Several chapters in this volume

consider water regimes that are under pressure from climate change, and they hint at different types of regimes, found in different parts of the world. Similarly, research on the indigenous fishing villages of Lake Titicaca in the Andean highlands of Peru and Bolivia traces conflicts between local and state regimes that govern water, granting fishing rights, permission to travel, and the management of economically important aquatic plants (Orlove 2002). The notion of water regime can be associated with resilience, because the rules and institutions that form part of specific water regimes shape response to external pressures such as climate change.

## Conclusion

We would like to recapitulate briefly the main points that we have tried to make: anthropologists have offered some insights into the study of the social life of water, emphasizing four themes—value, equity, governance, and politics. These lead to critical engagement with the notion of watersheds, to detailed understandings of waterscapes, and to examination of the unfolding of water regimes as they are created, contested, and transformed; these three components, in turn, compose entire waterworlds. Anthropological research documents the threats to waterworlds, pressed by climate change, population growth and increasing demand for material goods, but this research also points to many forms of resilience. As we turn our attention to these broad questions, as we consider large areas and shifts that take place over years and decades and generations, let us remember as well water in its immediacy, in its intimate connections with our bodies and lives—its timeless elementality.

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